AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions of claims in the application.

Claim 1 (Previously Presented): A nonlinear controller comprising: a first module composed of a nonlinear system for creating a synchronous state with a controlled object through a nonlinear interaction with the controlled object; and

a second module composed of a feedback system for adjusting a parameter to vary a relation value of the first module relating to the synchronization with the controlled object based on a difference between the relation value and a target relation value, wherein the controlled object is controlled by convergence of the relation value relating to the synchronization of the first module to the target relation value, and

the first module vibrates at different natural frequencies from the controlled object, and the nonlinear interaction has an entrainment effect.

Claim 2 (Cancelled)

Claim 3 (Previously Presented): The nonlinear controller as recited in Claim 1, wherein the relation value relating to the synchronization is a phase difference between a vibration of the controlled object and a vibration of the first module, and a parameter is the natural frequency of the first module.

Claim 4 (Previously presented): The nonlinear controller as recited in claim 1, wherein the synchronous state between the first module and the controlled object is achieved through transmission and reception of rhythm.

Claim 5 (Cancelled)

Claim 6 (Previously presented): The nonlinear controller as recited in Claim 3, wherein the synchronous state between the first module and the controlled object is achieved through transmission and reception of rhythm.

Claim 7 (Currently Amended): The nonlinear controller as recited in ~~Claims~~ Claim 1, wherein the synchronous state between the first module and the controlled object is achieved through a radio wave or network.

Claim 8 (Cancelled)

Claim 9 (Previously presented): The nonlinear controller as recited in Claim 3, wherein the synchronous state between the first module and the controlled object is achieved through a radio wave or network.

Claim 10 (Previously presented): The nonlinear controller as recited in Claim 4, wherein the synchronous state between the first module and the controlled object is achieved through a radio wave or network.

Claim 11 (Cancelled)

Claim 12 (Previously presented): The nonlinear controller as recited in Claim 6, wherein the synchronous state between the first module and the controlled object is achieved through a radio wave or network.

Claim 13 (Previously Presented): A nonlinear control method comprising: creating a synchronous state with a controlled object through a nonlinear interaction with the controlled object;

acquiring a state variable relating to a dynamic behavior of the controlled object;

adjusting a parameter for varying a relation value relating to the synchronization with the controlled object based on a difference between the relation value relating to the synchronization and a target relation value; and

creating a new synchronous state with the controlled object using the adjusted parameter.

Claim 14 (Previously presented): A program readable by a controller for causing the controller to perform the nonlinear control method as recited in Claim 13.

Claim 15 (New): A nonlinear controller comprising:

a first module composed of a nonlinear system (NLS) for achieving a synchronous state with a controlled object through a nonlinear interaction, in which dynamic behavior of the controller and the controlled object cannot be clearly separated, the nonlinear interaction being between the first module and the controlled object; and

a second module composed of a feedback system (FBS) for adjusting a parameter of the first module to vary a relation value relating to the synchronization with the controlled object directly using the difference between the relation value and a target relation value in the nonlinear interaction in which dynamic behavior of a controller and a controlled object cannot be clearly separated,

wherein the nonlinear interaction has an entrainment effect, and the controlled object is controlled by convergence of the relation value relating to the synchronization of the first module to the target relation value.

Claim 16 (New): The nonlinear controller as recited in Claim 15, wherein the relation value relating to the synchronization is the phase difference between the vibration of the controlled object and the vibration of the first module, and the parameter is the natural frequency of the first module;

the first module calculates the relation value using a state variable of the controlled object and equations approximating the dynamics of the controlled object and the first module as nonlinear vibrations;

the second module calculates a feedback control signal (FB) as a function relating to a difference between the calculated relation value and the target relation value and adjusts the parameter of the first module using the feedback control signal (FB);

the controlled object is controlled in that the relation value is converged to the target relation value through repeating said calculations and said adjustment.

Claim 17 (New): The nonlinear controller as recited in Claim 16, wherein the state variable of the controlled object is a phase of the controlled object.

Claim 18 (New): The nonlinear controller as recited in Claim 15 wherein the synchronous state between the first module and the controlled object is achieved through transmission and reception of rhythm.

Claim 19 (New): The nonlinear controller as recited in Claim 15, wherein the synchronous state between the first module and the controlled object is achieved through a radio wave or network.

Claim 20 (New): A nonlinear control method for controlling a controlled object using a nonlinear controller having a first module composed of a nonlinear system (NLS) for achieving a synchronous state with the controlled object through a nonlinear interaction with the controlled object and a second module composed of a feedback system (FBS) for adjusting a parameter of the first module to vary a relation value relating to the synchronization with the controlled object based on the difference between the relation value and a target relation value, comprising:

achieving a synchronous state through a nonlinear interaction, in which dynamic behavior of a controller and a controlled object cannot be clearly separated, the nonlinear interaction being between the first module and the controlled object and having an entrainment effect, wherein the achieving is done in the first module;

adjusting a parameter of the first module for varying a relation value relating to the synchronization between the first module and the controlled object directly using the difference between the relation value relating to the synchronization and a target relation value through the nonlinear interaction in which dynamic behavior of a controller and a controlled object cannot be clearly separated, wherein the adjusting is done in the second module; and

achieving a new synchronous state with the controlled object using the adjusted parameter and converging the relation value relating to the synchronization to the target relation value through co-operation of the first module and the second module.

Claim 21 (New): A program readable by a controller for causing the controller to perform the nonlinear control method as recited in Claim 20.